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the appearance of forms of similar types as those under cultivation.¹ The presumptive evidence is in favor of the view that all cultivated types are removes from nature, not new originations by man; yet the proof is not as decisive as could be wished.²

(To be continued.)

REVIEW OF THE PROGRESS OF NORTH AMERICAN PALÆONTOLOGY FOR THE YEAR 1886.

BY JOHN BELKNAP MARCOU.

THE year which has just passed has been fairly prolific in palæontologic works and promises well for the future of American palæontology. With the exception of the death of the veteran palæontologist and conchologist, Isaac Lea, of Philadelphia, we have to deplore the loss of no eminent workers in this branch of science.

I have extended this review so as to include the vertebrates, which I had not touched in my similar work for previous years, and, although my slighter acquaintance with the subject has made it much more difficult for me to get the material together, I trust that it will be found a welcome addition by those interested in this branch of the science.

T. H. Aldrich publishes a "Preliminary Report upon the Tertiary Fossils of Alabama and Mississippi" in the *Geol. Sur. Alabama*, Bull. No. 1, p. 18. In the *Four. Cincinnati Soc. Nat. His.*, vol. viii. p. 256, he has "Notes on the Distribution of Tertiary Fossils in Alabama and Mississippi."

J. A. Allen has an article "On an Extinct Type of Dog from Ely Cave, Lee County, Va.," in the *Mem. Mus. Comp. Zool.*, at Harvard College, vol. x. p. 1. Professor Shaler appends a note, from which one would infer that he considers the remains described to be of Pliocene age.

H. M. Ami, in the *Canad. Rec. Sci.*, vol. ii. p. 304, has a note "On the Occurrence of *Scolithus* in Rocks of the Chazy Formation about Ottawa, Ontario."

Charles A. Ashburner and Angelo Heilprin have, in the *Proc.*

¹ Joigneaux, *Traite des Graines*, 44.

² See *Proc. of Soc. for P. of Agr. Sc.*, 1886, p. 68, for an article of mine on this subject.

and *Collections Wyoming His. and Geol. Soc.*, vol. ii. p. 254, an article entitled "Report on the Wyoming Valley Carboniferous Limestone Beds, by C. A. Ashburner, Geologist in Charge of the Anthracite Survey, and Corresponding Member of the Wyoming Historical and Geological Society, accompanied by a Description of the Fossils contained in the Beds, by Angelo Heilprin."

L. W. Bailey has a "Report of Explorations and Surveys in Portions of the Counties of Carleton, Victoria, York, and Northumberland, New Brunswick, 1885," in the *Ann. Report Geol. and Nat. Surv. Canada*, new ser., vol. i. pp. 18-309.

Mariano Barcena, in the *AMERICAN NATURALIST*, vol. xx. p. 633, has a note on "The Fossil Man of Peñon."

W. H. Barris, in the *Proc. Davenport Acad. Nat. Sci.*, vol. v. p. 15, criticises a paper on the "Geology of Scott County, Iowa, and Rock Island County, Ill., by A. S. Tiffany."

G. Baur, in the *Morphologisches Jahrbuch*, Band xii. Heft 11, p. 299, has an article entitled "Ueber die Kanäle im Humerus der Amnioten." In the *Biologisches Centralblatt*, Band vi. p. 353, he has "Ueber die Morphogenie der Wirbelsäule der Amnioten."

J. P. Bishop gives a notice "On Certain Fossiliferous Limestones of Columbia County, N. Y., and their Relation to the Hudson River Shales and the Taconic System" in the *Amer. Jour. Sci.*, 3d ser., vol. xxxii. p. 438.

F. Brauer, in the *Annalen des k.k. Naturhistorischen Hofmuseums*, redigirt von Franz Ritter von Hauer, Band i. No. 2, p. 87, criticises some of S. H. Scudder's works in an article entitled "Ansichten über die paläozoischen Insecten und deren Deutung."

W. C. Brögger, in an article called "Om alderen af Olenellus-zonen i Nordamerika," *Geol. Forenings i Stockholm Forhand*, No. 101, Bd. viii. H. 3, p. 182, attempts to prove that the Olenellus beds are older than the Paradoxides beds.

R. E. Call has an article "On the Genus *Campeloma Rafinesque*, with a Revision of the Species, Recent and Fossil," in the *Bull. Washburn College Laboratory Nat. His.*, vol. i. No. 5, p. 159.

E. Canu has an article on "L'articulé problématique des dépôts tertiaires de Florissant; *Planocephalus aselloides* Scudder," in the *Soc. Geol. du Nord. Annales*, vol. xii. p. 148.

P. H. Carpenter has a "Note on the Structure of *Crotalocrinus*" in the *Ann. and Mag. Nat. His.*, 5th ser., vol. xviii. p. 397.

R. Chalmers has a "Preliminary Report on the Surface Geology of New Brunswick" in the *Ann. Report Geol. and Nat. His. Surv. Canada*, new ser., vol. i. p. 1, gg.

E. W. Clappole, in the *Proc. and Coll. Wyoming Hist. and Geol. Soc.*, vol. ii. pt. 2, p. 239, has a "Report on Some Fossils from the Lower Coal-Measures near Wilkesbarre, Luzerne County, Pa."

E. A. Congdon has "Remarks upon a Deposit of Infusorial Earth on the South Shore of Clove Lake, Staten Island," in the *Proc. Nat. Sci. Assoc. Staten Island*, May 8, 1886.

E. D. Cope has "Second Continuation of Researches among the Batrachia of the Coal-Measures of Ohio" in the *Proc. Amer. Phil. Soc.*, vol. xxxii. p. 405. In the *Trans. Vassar Bro. Inst.*, vol. iii. pt. 1, p. 60, he has an address entitled "The Genealogy of the Vertebrata as learned from Palæontology." He has notes on "The Sternum of the Dinosauria;" "Corrections of Notes on the Dinocerata," in the *AMERICAN NATURALIST*, vol. xx. pp. 153 and 155. In the *Geol. Mag.*, new ser., Decade iii. vol. iii. p. 49, is an article entitled "Prof. E. D. Cope on a New Type of Perissodactyle Ungulate from the Wasatch Eocene of Wyoming Territory, United States of America;" on p. 141 of the same magazine he has a note on "Edestus and Pelecopterus." In the *AMERICAN NATURALIST*, vol. xx. p. 367, he has a note on "The Vertebrate Fauna of the Ticholeptus Beds;" on p. 451 he has an article on "The Plagiaulacidæ of the Puerco Epoch." In the *Geol. Mag.*, new ser., Decade iii. vol. iii. p. 238, he has "Notes on Phenacodus;" on p. 239 he has a "Note on Erisichthe." He has a report on the "Vertebrata of the Swift Current Creek Region of the Cypress Hills" in the *Ann. Rep. Geol. and Nat. Hist. Surv. Canada*, 1885, published May, 1886. He has a note on "The Long-spined Theromorpha of the Permian Epoch" in the *AMERICAN NATURALIST*, vol. xx. p. 544; on p. 611 he has an article on "The Phylogeny of the Camelidæ;" on p. 1027 he has "An interesting Connecting Genus of Chordata;" on p. 1044 he describes "A Giant Armadillo from the Miocene of Kansas." In the *Trans. Amer. Philos. Soc. Philad.*, vol. xii, 2d ser., p. 243, he has an article "On the Intercentrum of the Terrestrial Vertebrata." He also published a book on "The Origin of the Fittest, Essays on Evolution," published in New York. In the *Trans. Am. Phil. Soc.*, vol. xvi. p. 285, he has a "Systematic Catalogue

of Species of Vertebrata found in the Beds of the Permian Epoch in North America, with Notes and Descriptions." In the *Proc. Amer. Phil. Soc.* for 1885, p. 234, he has an article "On the Structure of the Brain and Auditory Apparatus of a Theromorphous Reptile of the Permian Epoch."

F. W. Cragin has "Notes on the Geology of Southern Kansas" in the *Bull. Washburn College Laboratory Nat. Hist.*, vol. i. No. 3, p. 85.

K. M. Cunningham, in *Science*, vol. vii. p. 35, calls attention to a "New Find of Fossil Diatoms."

T. Nelson Dale, in the *Proc. Canadian Inst.*, 3d ser., vol. iv. p. 69, has a note on "New England Upper Silurian."

James D. Dana, in the *Proc. A. A. A. Sci.*, vol. xxxiv. p. 216, and in the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 241, has an article "On Lower Silurian Fossils from a Limestone of the Original Taconic of Emmons." In the *Amer. Jour. Sci.*, 3d ser., vol. xxxii. p. 236, he has a note on "The Taconic Stratigraphy and Fossils."

Nelson H. Darton, in *Sci.*, vol. vii. p. 78, has a note entitled the "Taconic Controversy in a Nutshell." In the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 209, he has an article "On the Area of Upper Silurian Rocks near Cornwall Station, Eastern Central Orange County, N. Y."

W. Davies, in the *Geol. Mag.*, new ser., Decade iii. vol. iii. p. 141, has a "Note on Prof. E. D. Cope's article upon Edestus and Pelecopterus, etc."

Sir J. W. Dawson has an abstract of a paper "On the Fossil Flora of the Laramie Series of Western Canada" in the *AMERICAN NATURALIST*, vol. xx. p. 635, and in the *Amer. Jour. Sci.*, 3d ser., vol. xxxii. p. 242. In the *Geol. Mag.*, new ser., Decade iii. p. 503, he has an abstract of a paper "On Canadian Examples of Supposed Fossil Algæ."

William B. Dwight, in the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 125, has an article on "Recent Explorations in the Wappinger Valley Limestone of Dutchess County, N. Y., No. 5, Discovery of Fossiliferous Potsdam Strata at Poughkeepsie, N. Y.," and a note on this subject is also placed in the *Proc. A. A. A. S.*, vol. xxxiv. pt. 1, p. 204.

R. W. Ellis has a "Report on the Geological Formations of Eastern Albert and Westmoreland Counties, New Brunswick,

and of Portions of Cumberland and Colchester Counties, Nova Scotia, embracing the Spring Hill Coal Basin and the Carboniferous System north of the Cobequid Mountains," in the *Geol. and Nat. Hist. Surv. Canada Ann. Rep.*, new ser., vol. i. p. 1 e.

Robert Etheridge, Jr., and P. Herbert Carpenter have published a "Catalogue of the Blastoidea in the Geological Department of the British Museum (Natural History), with an Account of the Morphology and Systematic Position of the Group and a Revision of the Genera and Species;" in this many American forms are described and discussed.

John Eyerman, in the *American Jour. Sci.*, 3d ser., vol. xxxi. p. 72, has a note on "Footprints on the Triassic Sandstone (Jura-Trias) of New Jersey."

Charles L. Faber has some "Remarks on Some Fossils of the Cincinnati Group" in the *Jour. Cincinnati Soc. Nat. Hist.*, vol. ix. p. 14.

H. Filhol has "Observations sur le mémoire de M. Cope intitulé Relations des Horizons renfermant des débris d'animaux vertébrés Fossiles en Europe et en Amérique" in the *Ann. Sci. Geol.*, vol. xvii. p. 1.

S. W. Ford has "Notice of a New Genus of Lower Silurian Brachiopoda," and "Note on the recently proposed Genus *Billingsia*," in the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 466, and vol. xxxii. p. 325. He has also published a "Note on the Age of the Swedish Paradoxides Beds" in the *Amer. Jour. Sci.*, 3d ser., vol. xxxii. p. 473. In connection with W. B. Dwight he has published a "Preliminary Report of S. W. Ford and W. B. Dwight upon Fossils obtained in 1885 from Metamorphic Limestones of the Taconic Series of Emmons, at Canaan, N. Y. (A) Explanatory Statements with Reference to the Palæontological Investigations at Canaan, N. Y., by W. B. Dwight. (B) Joint Report on the Fossils" in the *American Jour. Sci.*, 3d ser., vol. xxxi. p. 248.

A. F. Foerste describes the fossils of "The Clinton Group of Ohio" in the *Bull. Sci., Laboratories Denison University*, vol. i. p. 63.

C. E. Grant and Sir J. W. Dawson have "Notes on Pleistocene Fossils from Anticosti" in the *Can. Rec. Sci.*, vol. ii. p. 44.

L. P. Gratacap has a note on "Fish Remains and Tracks in the Triassic Rocks at Weehawken, N. J.," in the *AMERICAN NATURALIST*, vol. xx. p. 243.

James Hall has "Bryozoa of the Upper Helderberg Group, Plates and Explanations. Published in advance of the Report of the State Geologist for 1886, and of vol. vi., Pal. N. Y., 1886, pls. i.-xii. pp. 1-29. Albany, 1886."

F. L. Harvey has a note "On *Anthracomartus trilobitus* Scudder" in the *Proc. Acad. Nat. Sci. Philada.*, p. 231, September, 1886.

Angelo Heilprin has "Notes on the Tertiary Geology and Palæontology of the United States" in the *Proc. Acad. Nat. Sci.*, p. 57, March, 1886, Philadelphia. In the *Trans. Wagner Free Institute Sci.*, p. 65, Philad., 1886, he has "Explorations on the West Coast of Florida and in the Okeechobee Wilderness, with Special Reference to the Geology and Zoology of the Floridian Peninsula. A Narrative of Researches undertaken under the Auspices of the Wagner Free Institute of Science of Philadelphia." Many new species without illustrations are described in this paper. He has also a note "On Miocene Fossils from Southern New Jersey" in the *Proc. Acad. Nat. Sci. Philad.*, p. 351, December, 1886.

L. E. Hicks has a note on "The Permian in Nebraska" in the *AMERICAN NATURALIST*, vol. xx. p. 881.

E. W. Hilgard has a note on "Dr. Otto Meyer and the South-western Tertiary" in *Science*, vol. vii. p. 11. In the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 398, is an abstract of a paper entitled "Making Deposits of the Remains of Birds, Squirrels, and other Small Animals," from William's "Mineral Resources of the United States for the Years 1883-4."

Franklin C. Hill has an article "On the Mounting of Fossils" in the *AMERICAN NATURALIST*, vol. xx. p. 353.

G. J. Hinde, in *Ann. and Mag. Nat. Hist.*, p. 271, March, 1886, has an article on "*Hystricrinus* Hinde versus *Arthroacantha* Williams, a Question of Nomenclature."

Arthur Hollick publishes "Remarks on Some Fossil Leaves from Kreischerville and New Jersey" in the *Proc. Nat. Sci. Assoc. Staten Island*, February 13, 1886.

Joseph F. James has "Cephalopoda of the Cincinnati Group;" "Description of a New Species of *Gomphoceras* from the Trenton of Wisconsin;" and "Note on a Recent Synonyme in the Palæontology of the Cincinnati Group," in the *Jour. Cin. Soc. Nat. Hist.*, vol. viii. pp. 235 and 255, and vol. ix. p. 39.

T. Rupert Jones has an article "On Palæozoic Phyllopoda," and one "On Some Fossil Ostracoda from Colorado," in the *Geol. Mag.*, new ser., Decade iii. vol. iii. pp. 456 and 145.

Geo. F. Kunz has an article on "Agatized and Jasperized Wood of Arizona" in the *Pop. Sci. Monthly*, vol. xxviii. p. 362.

G. W. Lamplugh, in the *Quart. Jour. Geol. Soc. London*, vol. xlii. pt. 3, p. 276, has an article "On Glacial Shell Beds in British Columbia."

D. W. Langdon publishes "Observations on the Tertiary of Mississippi and Alabama, with Descriptions of New Species," in the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 202.

Joseph Leidy has "Mastodon and Llama from Florida;" "An Extinct Boar from Florida;" and "Caries in the Mastodon," in *Proc. Acad. Nat. Sci. Phila.*, pp. 11, 37, and 38, March, 1886.

Lennox has a note on "The Fossil Sharks of the Devonian" in the *Proc. Canadian Inst.*, 3d ser., vol. iii. p. 120.

Richard Lydekker has published "Catalogue of the Fossil Mammalia in the British Museum (Natural History), Cromwell Road S. W., part iii., containing the Order Ungulata, suborders Perissodactyla, Toxodontia, Condylarthra, and Amblypoda." This contains many American species.

A. McCharles has published a paper entitled "The Extinct Cuttle-Fish in the Canadian Northwest. A Paper read before the Canadian Institute, Toronto, March 4, 1885."

John Belknap Marcou has published "Department of the Interior, U. S. National Museum, Serial No. 40, *Bulletin of the United States National Museum*, No. 30, published under the direction of the Smithsonian Institution. Bibliographies of American Naturalists, III. Bibliography of Publications relating to the collection of Fossil Invertebrates in the United States National Museum, including Complete Lists of the Writings of Fielding B. Meek, Charles A. White, and Charles D. Walcott. Washington, 1885." Four hundred copies of an extract from this were published under the title "Annotated Catalogue of the Published Writings of Charles Abiathar White, 1860-1885. Extracted from *Bull. 30, U. S. National Museum*, pp. 11-181, 1885." In the *Proc. U. S. Nat. Mus.*, vol. ix. p. 250, he has a "Supplement to the List of Mesozoic and Cenozoic Invertebrate Types in the Collections of the National Museum." In the *AMERICAN NATURALIST*, vol. xx. p. 505, he has a "Review of the Progress

of North American Invertebrate Palæontology for 1885;" and, finally, a "Record of North American Invertebrate Palæontology for the Year 1885, from the Smithsonian Report for 1885. Washington, 1886."

George F. Matthew has "Illustrations of the Fauna of the St. John Group continued, No. 3. Descriptions of New Genera and Species (including a Description of a New Species of *Solenopleura*, by J. F. Whiteaves)," in the *Proc. and Trans. Roy. Soc. Canada* for the year 1885, vol. iii. section iv. p. 29. He has a "Synopsis of the Fauna in Division 1, of the St. John Group, with Preliminary Notes on the Higher Faunas of the same Group;" in the *Bull. Nat. His. Soc. New Brunswick*, No. 5, p. 25, he publishes a note on "The Structural Features of *Discina acadica* (Hartt) of the St. John Group," and one on the "Discovery of a Pteraspidian Fish in the Silurian Rocks of New Brunswick," in the *Canadian Rec. Sci.*, vol. ii. No. 1, p. 9, and No. 4, p. 251. In the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. pp. 72 and 472, he has a "Pteropod of the St. John Group (from a Letter by Mr. G. F. Matthew, dated St. John, New Brunswick, December 8)," and a "Note on the Occurrence of *Olenellus kjerulfi* in America." He has an "Additional Note on the Pteraspidian Fish found in New Brunswick" in the *Canad. Rec. Sci.*, vol. v. No. 5, p. 323.

Otto Meyer and T. H. Aldrich have published in the *Four. Cin. Soc. Nat. His.*, vol. ix. p. 40, an article on "The Tertiary Fauna of Newton and Wautubbee, Miss."

Otto Meyer, in the *Geol. Sur. Alabama*, Bull. No. 1, pt. 2, p. 63, has "Contributions to the Eocene Palæontology of Alabama and Mississippi." In the *Amer. Jour. Sci.*, 3d ser., vol. xxxii. p. 20, he has "Observations on the Tertiary and Grand Gulf of Mississippi." In the *AMERICAN NATURALIST*, vol. xx. p. 637, he has "Notes on the Variation of Certain Tertiary Fossils in Overlying Beds."

Fred. K. Mixer and Herbert U. Williams have a note on "Fish Remains from the Corniferous near Buffalo" in the *Bull. Buffalo Soc. Nat. Sci.*, vol. v. p. 84.

D. R. Moore has an article on "Fossil Corals of Franklin County, Indiana," in the *Bull. Brookville Soc. Nat. His.*, No. 2, p. 50; and in No. 1, p. 44, he has "Two Hours among the Fossils of Franklin County, Ind."

Charles Morris has an article on "Methods of Defence in

Organisms" in the *Proc. Acad. Nat. Sci. Philada.*, p. 25, March, 1886.

J. S. Newberry, in the *Bull. Torrey Botanical Club*, vol. xiii. pp. 33 and 77, has "The Flora of the Amboy Clays," and "Description of a Species of *Bauhinia* from the Cretaceous Clays of New Jersey." In the *Trans. N. Y. Acad. Sci.*, vol. v. p. 133, he has an abstract of a paper on "The Cretaceous Flora of North America, Illustrated by Drawings and Lantern Views."

H. Allyne Nicholson has an article "On Some New or Imperfectly-known Species of Stromatoporoids" in *Ann. and Mag. Nat. Hist.*, 5th ser., vol. xviii. p. 8, London. Several American species are described. He has also published "A Monograph of the British Stromatoporoids, pt. I, General Introduction. The Palæontological Society, Instituted 1847, vol. for 1885. London, 1886."

Henry F. Osborn has "A New Mammal from the American Triassic" in *Science*, vol. viii. p. 540. In the *Proc. Acad. Nat. Sci.*, p. 359, December, 1886, he has "Observations upon the Upper Triassic Mammals, *Dromatherium* and *Microconodon*."

Richard Owen has an article "On a New Perissodactyle Ungulate from Wyoming" in the *Geol. Mag.*, new series, Decade iii. vol. iii. p. 140.

A. S. Packard has an article on "Geological Extinction and some of its Apparent Causes," and on the "Discovery of Lamellate Thoracic Feet in the Phyllocarida" in the *AMERICAN NATURALIST*, vol. xx. pp. 29 and 155, and in the *Proc. Amer. Phil. Soc. Philad.*, vol. xxiii. p. 380.

J. Hayes Panton has "Fragmentary Leaves from the Geological Records of the Great Northwest;" "Gleanings from the Geology of the Red River Valley;" "Gleanings from Outcrops of Silurian Strata in the Red River Valley;" and "Notes on the Geology of Some Islands in Lake Winnipeg," in the *Manitoba Hist. and Sci. Soc. Winnipeg Trans.*, Nos. 4, 3, 15, and 20.

Julius Pohlman has an article on "Fossils from the Waterlime Group near Buffalo, N. Y.," in the *Bull. Buffalo Soc. Nat. Sci.*, vol. v. p. 23.

F. W. Putnam has a note on the "Discovery of a Mastodon Skull at Shrewsbury" in the *Proc. Boston Soc. Nat. Hist.*, vol. xxiii. p. 242.

H. Rauff has a note "On the Genus *Hindia* Dunc." in the *Ann. and Mag. Nat. Hist.*, 5th ser., vol. xviii. p. 169.

Eugene N. S. Ringueberg has descriptions of "New Genera and Species of Fossils from the Niagara Shales" in the *Bull. Buffalo Soc. Nat. Sci.*, vol. v. p. 1.

C. Rominger has an article "On the Minute Structure of Stromatopora and its Allies" in the *Proc. Acad. Nat. Sci. Phila.*, p. 39, March, 1886.

Oscar Schmidt has published in the *International Scientific Series* "The Mammalia in their Relation to Primeval Times. New York, 1886;" this is a translation of his German work.

W. B. Scott has an article "On Some New Forms of Dinoce-rata" in the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 303.

S. H. Scudder, in the *Mem. Boston Soc. Nat. Hist.*, vol. iii. No. 13, pp. 431, 438, and 439, has "The Oldest Known Insect Larva, *Mormolucoides articulatus*, from the Connecticut River Rocks;" "Note on the supposed Myriopodan Genus *Trichiulus*;" and "A Review of Mesozoic Cockroaches." He has also published an article entitled "The Cockroach of the Past," reprinted from "The Structure and Life History of the Cockroach (*Periplaneta orientalis*), by L. C. Miall and Alfred Denny, pp. 205-219. London, 1886." In the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 310, he describes a "New Carboniferous Arachnid from Arkansas." *Bull. U. S. Geol. Surv.*, No. 31, is a "Systematic Review of our Present Knowledge of Fossil Insects, including Myriapods and Arachnids;" this appeared first in German as a portion of "Zittel's Handbuch der Paleontologie," I. Abtheilung Paleozoologie, Bd. ii. p. 721.

H. M. Seely has a note on "The Genus *Strephochetus*, Distribution and Species," in the *Amer. Jour. Sci.*, 3d ser., vol. xxxii. p. 31.

N. S. Shaler has a "Preliminary Report on the Geology of the Cobscook Bay District, Maine. Published by permission of the Director of the U. S. Geol. Survey," in the *Amer. Jour. Sci.*, vol. xxxii. p. 35.

A. H. Smith has a note on "The Railway Cutting at Gray's Ferry Road" in the *Proc. Acad. Nat. Sci. Phila.*, p. 253, September, 1886.

M. Stirrup has an article "On Some Fossils from the Palæozoic Rocks of America, principally from the State of Indiana," in the *Manchester Geol. Soc. Trans.*, vol. xviii. p. 331.

T. Thorell has an article "On *Proscorpius osbornei* Whitfield" in the *AMERICAN NATURALIST*, vol. xx. p. 269.

A. S. Tiffany has a work on the "Geology of Scott County, Iowa, and Rock Island County, Ill., and the Adjacent Territory, showing the Geographical and Vertical Range of the Fossils of the Niagara Corniferous and Hamilton Groups of Rocks, and the Chemung Group at Burlington, Iowa, with Supplement. Davenport, Iowa, 1885."

E. O. Ulrich has "Descriptions of New Silurian and Devonian Fossils, Contributions to American Palæontology, vol. i. p. 3, May, 1886, Cincinnati." He has a "Report on the Lower Silurian Bryozoa, with Preliminary Descriptions of some of the New Species," and "Remarks upon the Names *Cheirocrinus* and *Calceocrinus*, with Descriptions of three New Generic Terms and one New Species," in the *14th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota*, pp. 57 and 104.

Charles Wachsmuth and Frank Springer have published "Revision of the Palæocrinoidea, Part III. Discussion of the Classification and Relations of the Brachiate Crinoids, and Conclusion of the Generic Descriptions, Second Section," in the *Proc. Acad. Nat. Sci. Phila.*, p. 65, March and September, 1886. The author's edition contains, in addition to the article, in the *Proceedings*, an index of all generic and specific names used in connection with the Palæocrinoidea.

M. E. Wadsworth has a note "On a Supposed Fossil from the Copper-Bearing Rocks of Lake Superior" in the *Proc. Boston Soc. Nat. His.*, vol. xxiii. p. 208.

C. D. Walcott has an article on the "Classification of the Cambrian System of North America" in the *Amer. Jour. Sci.*, 3d ser., vol. xxxii. p. 138. He has also published a "Second Contribution to the Cambrian Faunas of North America," *Bull. 30, U. S. Geol. Surv.* Washington, 1886.

L. F. Ward has a "Note on a few Imperfect Leaf Impressions from Northern California" in *Bull. U. S. Geol. Surv.*, No. 33, p. 16. In the *Amer. Jour. Sci.*, 3d ser., vol. xxxi. p. 370, he has a note "On the Determination of Fossil Dicotyledonous Leaves."

C. A. White has published "On the Fresh Water Invertebrates of the North American Jurassic," *Bull. U. S. Geol. Surv.*, No. 29, Washington, 1886, and "On the Relation of the Laramie Molluscan Fauna to that of the Succeeding Fresh-Water Eocene and other Groups," *Bull. U. S. Geol. Surv.*, No. 34. Washington, 1886.

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N. H. Winchell has a "Notice of Lingula and Paradoxides from the Red Quartzites of Minnesota, Abstract," in the *Proc. A. A. A. S.*, vol. xxxiv. part i. p. 214. "The Taconic Controversy in a Nutshell" in *Science*, vol. vii. p. 34. He describes "New Species of Fossils" in the *14th Annual Rep. Geol. and Nat. Hist. Surv. Minnesota* for the year 1884, p. 313, and gives a list of "Specimens Registered in the General Museum in 1885" on pp. 125-6.

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THE DIPNOAN BRAIN.¹

BY BURT G. WILDER.

THIS paper includes an account of the brain of *Ceratodus* (*Neoceratodus* Gill), substantiated by photographs and preparations of three unusually well-preserved specimens in the Museum of Cornell University; an admission of the writer's own earlier errors in respect to the brains of "fishes," especially in disregarding the membranous portions of the cœlian parietes; a criticism of Huxley's paper in the *Zool. Soc. Proc.*, January 4, 1876 (the later paper of Beauregard does not discuss the *structure* of the brain); a tabular statement of the resemblances and differences between the Dipnoi and other groups, particularly the Plagiostomes and Amphibia; a reiteration of belief (*Am. Assoc. Proc.*, 1875, 189) in the paramount value of cardiac and encephalic characters for the discrimination of more comprehensive groups; a reference to the morphological significance of the *aula* or mesal division of the prosocœle; a list of points requiring further investigation.

The brain of *Ceratodus* agrees with that of *Protopterus* (as described and figured by Fulliquet in the *Recueil Zool. Suisse* for 1886, and as seen in a recent dissection by the writer) in the important point that *the prosencephal consists mainly of a pair of large lobes whose cavities (procœles or "lateral ventricles") are connected only by a comparatively small aula*, as in Amphibia and the higher vertebrates. Unlike *Protopterus*, however, between the dorsal parts of these lobes there is a *long and thick supraplex*, which, through an interruption of the proper nervous parietes for nearly the whole length, sends into each lobe a prolongation covered, like all plexes, by the lining endyma. In mammals,

¹ Abstract of a paper "On the Brain of *Ceratodus*, with Remarks upon Classification and the General Morphology of the Vertebrate Brain," read, by invitation, before the National Academy of Sciences, April 22, 1887.